WEIL-McLAIN®

EGH Series 5

Gas-Fired Boilers

Control Supplement

EGH-105 to EGH-125
Natural gas‡

CSD-1 control system



‡ For **propane** boilers, install EGH liquefied petreoleum (propane) gas conversion kit in addition to following the instructions in this Control Supplement.

⚠WARNING This supplement must only be used by a qualified heating installer/service technician. **Before installing**, read all instructions, including this supplement, the boiler manual and any related documents. Perform steps in the order given. Failure to comply could result in severe personal injury, death or substantial property damage.

Part No. 550-110-677/1112

Please read this page first

Hazard definitions

The following terms are used throughout this Control Supplement to bring attention to the presence of hazards of various risk levels or to important information concerning the life of the product.

DANGER Indicates presence of hazards that will cause severe personal injury, death or substantial property damage.

WARNING Indicates presence of hazards that can cause severe personal injury, death or substantial property damage.

CAUTION Indicates presence of hazards that will or can cause minor personal injury or property damage.

NOTICE Indicates special instructions on installation, operation or maintenance that are important but not related to personal injury or property damage.

To the installer:

WARNING This Control Supplement must only be used by a qualified installer/service technician. Read these instructions completely before beginning the installation. Failure to follow these instructions can cause severe personal injury, death or substantial property damage.

This Control Supplement is for CSD-1 controls on EGH-105 to EGH-125 boilers only, specifically for:

- Steam boilers ***with or without*** tankless heater.

This document is only intended as a supplement to the ***EG, PEG and EGH (Series 5) Boiler Manual***. Follow all instructions in the **EG, PEG and EGH Manual** in addition to the instructions in this Control Supplement.

NOTICE The installation must conform to the requirements of the authority having jurisdiction, or, in the absence of such requirements, to the National Fuel Gas Code, ANSI Z-223.1/NFPA-54 (latest edition). Where required by the authority having jurisdiction the installation must conform to the American Society of Mechanical Engineers (ASME) Safety Code for Controls and Safety Devices for Automatically-Fired Boilers, Number CSD-1.

Contents

Carton guide

Table 1 **Boiler cartons**

Verify that the correct cartons are available before beginning assembly. Note that the Base assembly and Trim & controls cartons for CSD-1 are special. The CSD-1 ignition control panel (in Base assembly carton) consists of ignition control module, impulse relay and lighted push-button switch mounted and wired on a panel base.

Carton	Comments	EGH-105	EGH-115	EGH-125
Section assembly	With tankless opening	321-711-120	321-711-130	321-711-140
	Without tankless opening	321-711-125	321-711-135	321-711-145
Base assembly (a)	CSD-1	381-700-507	381-700-508	381-700-509
Base panels		381-700-251	381-700-256	381-700-261
Jacket		411-800-281	411-800-291	411-800-301
Collector hood		450-014-757	450-014-758	450-014-759
Draft hood		450-206-242	450-206-243	450-206-244
Float low water cutoff (steam)	Gravity return (M&M #67W-1)	381-700-341	381-700-341	381-700-341
	Pumped return (M&M #42-A)	511-114-531	511-114-531	511-114-531
Vent damper (optional) (b)		381-800-446	381-800-447	381-800-447
Tankless heater (option)	Steam boilers only	386-700-350	386-700-350	386-700-350
Trim & control (see below)	Steam, CSD-1, Gravity return — or —	381-700-408	381-700-408	381-700-408
	Steam, CSD-1, Pumped return	381-700-410	381-700-410	381-700-410

Note a – Base assembly includes burner tubes, gas train components, pilot assembly and control panel (with ignition control).
Note b – EGH vent dampers meet ASME CSD-1 requirements (paragraph CF-210(c) because they comply with ANSI Z21.13.

Steam trim and control carton Gravity return	Steam trim and control carton Pumped return
Pressure limit control, automatic reset	Pressure limit control, automatic reset
Pressure limit control, manual reset	Pressure limit control, manual reset
Probe low water cutoff, manual reset	Probe low water cutoff, manual reset
Transformer/relay	Transformer/relay
Wire harness, steam gravity return	Wire harness, steam pumped return
Crimp spade wire terminations	Crimp spade wire terminations
ASME Relief valve	ASME Relief valve
Pressure gauge	Pressure gauge
Gauge glass and valves	Gauge glass and valves
Brass cross, brass nipple, bushings (3) and siphons (3) for mounting pressure controls and gauge	Brass cross, brass nipple, bushings (3) and siphons (3) for mounting pressure controls and gauge

Installation

Place the boiler

Refer to the **EG, PEG & EGH Manual.** Read and follow all of its guidelines.

Complete the following steps of the **EG, PEG & EGH Manual**:

- Placing the boiler
- Installation of optional water heaters, steam boilers only
- Hydrostatic pressure test
- Installation of flue collector hood
- Installation of (burner) drawer assembly and front access panel and back base channel
- Jacket installation
- Draft hood installation

Install gas train

Connect gas train assembly to burner manifold:

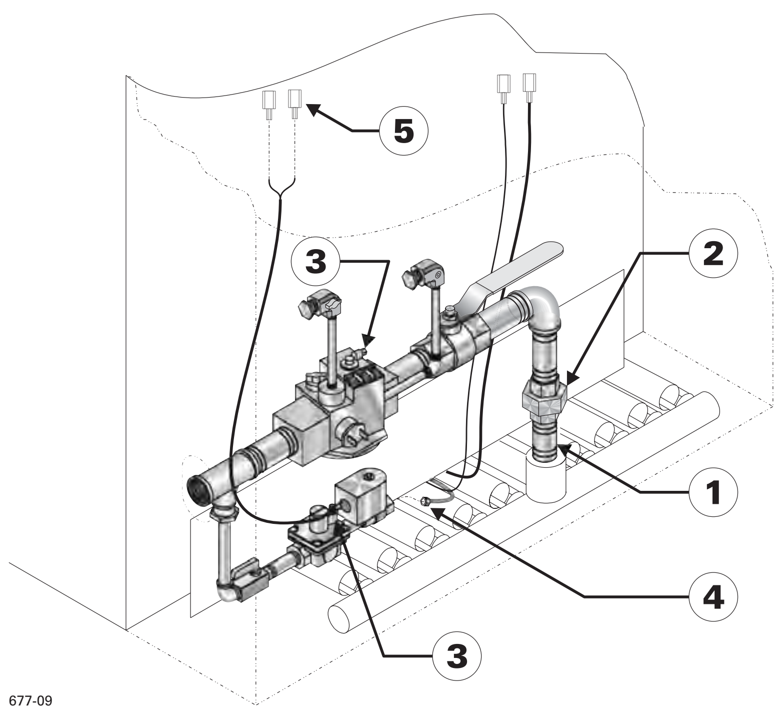
- Apply pipe dope to 1" nipple for insertion into burner manifold coupling (Figure 1, item 1). Insert and tighten nipple.
- Pipe lower half of ground joint union to the 1" nipple (Figure 1, item 2).
- Knock out the jacket gas valve opening on the desired side of the boiler (may be routed through either right or left side).
- Place gas train in position (either routed to the left, as shown, or to the right) and tighten the ground joint union loosely. Position the gas train assembly and tighten the union.
- Connect vent lines (routed to outside per code requirements) to ¼" tubing vent connections on main gas valve and pilot gas pressure regulator (Figure 3, item 3).
- Connect pilot gas tubing (1/8" aluminum) to adapter in pilot gas valve outlet (Figure 1, item 4).
- Crimp connect two ¼" spade terminals (provided) to ends of pilot gas valve wires (Figure 1, item 5).

Install vent/breeching

Install vent system and breeching per **EG, PEG & EGH Manual**. If optional vent damper is used, install vent damper (page 5) before installing breeching.

Figure 1

Gas train assembly



Install optional vent damper (if supplied)

If not installing a vent damper, proceed to next section (***Piping connections***).

NOTICE Once a vent damper has been operated on an EGH boiler, the boiler will no longer operate without a damper installed.

WARNING Only dampers listed in the Replacement parts list in this Supplement are certified for use with EGH Series 5 boilers. Any other damper installed could cause severe personal injury or death.

Minimum clearances — Provide a minimum of 6" between the damper and any combustible material. (Provide a minimum of 46" between EGH jacket top and a combustible ceiling.)

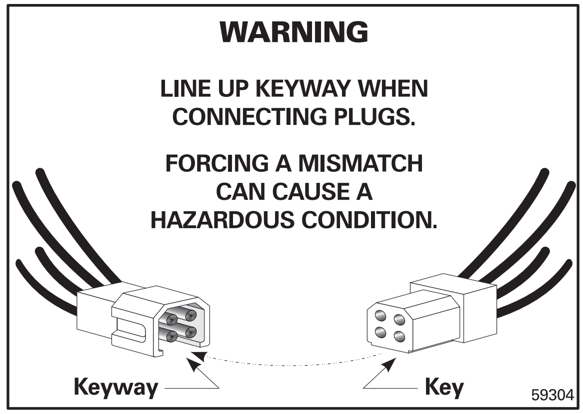
DANGER Damper must be installed directly on top of draft hood so that it serves only that boiler. DO NOT modify draft hood or damper, or make another connection between draft hood and damper or boiler. This will void CSA certification and will not be covered by Weil-McLain warranty. Any changes will cause severe personal injury, death or substantial property damage.

Install damper directly on top of draft hood, with arrow pointing straight up. Install so the damper blade indicator is visible to the user. See Figure 2.

Screws or rivets used to secure the damper to the vent pipe and the draft hood must not interfere with rotation of the damper blade.

Install damper harness between damper actuator and knockout in right top of boiler jacket. Knock out opening in jacket top and install strain relief bushings in jacket and actuator wiring openings. Insert wires and secure strain relief clamps. See Figure 5 or 7 as applies.

CAUTION Keep wiring harnesses clear of all hot surfaces.



Read and apply the harness plug warning label (above) so that it is visible after installation.

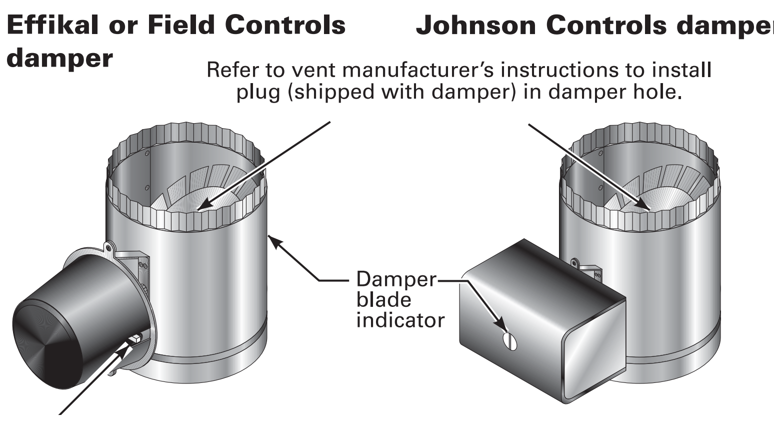
Remove dummy plug from damper connector in boiler wiring harness. Plug damper harness receptacle into damper harness plug. See Figure 5 or 7 as applies.

DANGER By-passing (jumpering) damper will cause flue products such as carbon monoxide to escape into the house. This will cause severe personal injury or death.

CAUTION After boiler has operated once, if either end of harness is disconnected, the system will shut down. The boiler will not operate until the harness is reconnected.

Figure 2

Vent damper assemblies



Piping connections

Connect steam piping to the boiler per **EG, PEG & EGH Manual**.

Install boiler controls —*steam boilers*

⚠WARNING All water level controls must mount on the left end of the boiler. Failure to do so could result in nuisance shutdowns and possible lockout on the manual reset control due to water level variations from end to end. Substantial property damage could result from freezing due to loss of heat.

NOTICE All controls must mount on left end of the boiler. The correct tappings are available only on the left end section.

Install steam trim components as required by CSD-1, latest edition. See Figure 3 and Table 2. See also Figure 8 or Figure 10 for finished assembly.

- CSD-1 requires two low water cutoffs (one manual reset) and two limit controls (one manual reset) as shown in the illustration.
- For float type (automatic reset only) low water cutoffs other than those shown in this Supplement, refer to **EG, PEG & EGH Manual** for mounting and piping instructions.

NOTICE Install a blowdown valve on any float type low water cutoff as described in the **EG, PEG & EGH Manual**

Plug all unused tappings.

All piping and control connections must also comply with the **EG, PEG & EGH Manual.**

Optional heaters — *steam boilers only*

Install optional tankless heater, if used, (steam boiler only) per **EG, PEG & EGH Manual**.

Figure 3

Steam boiler connections

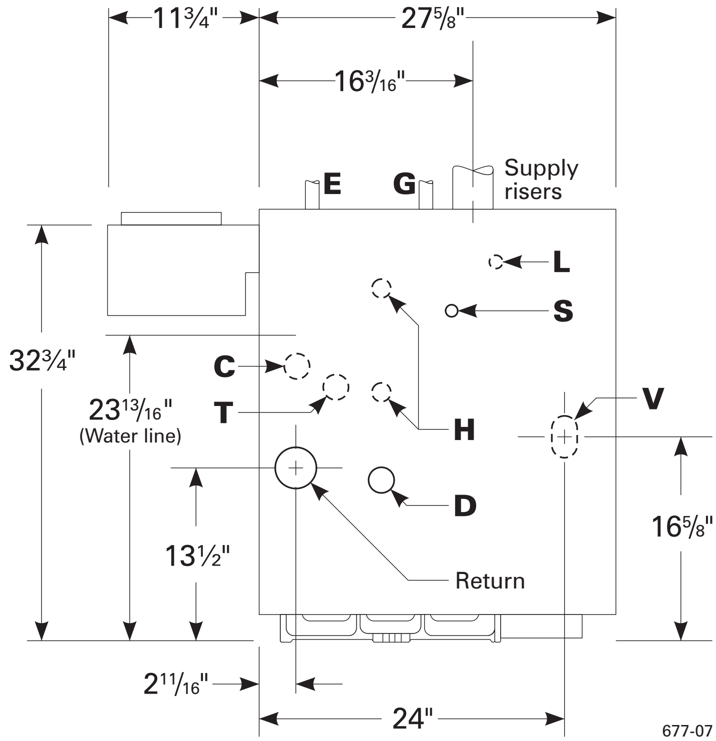


Table 2

Steam boiler connections

Tapping	Application	W-M Part No.
T	McDonnell & Miller PS852M-24 M/R probe LWCO	511-114-530
C	Not used — plug tapping	—
D	Drain connection (per **EGH manual**)	—
E	ASME relief valve (per **EGH manual**)	—
G	Not used — plug tapping	—
H	Float LWCO, automatic reset — Gravity return — McD-M 67W-1 Pumped return — McD-M 42-A	— 511-114-494 511-114-531
L	Pressure gauge Pressure limit, automatic reset Honeywell L404C-1147 M/R limit	510-218-045 510-312-135 510-312-060
S	Skim tapping (per **EGH manual**)	—
V	Gas supply connection (right or left)	—
Plug all tappings not used.		

Gas piping

Size and connect gas supply piping per **EG, PEG & EGH Manual**.

The gas supply can enter from either the right or left side of the jacket. Be sure the gas train is directed to the correct side.

WARNING Support gas line securely. Do not support weight of gas line off of boiler gas train.

Purge air from gas piping and perform gas line and gas connection leak test **EG, PEG & EGH Manual**.

Wiring

WARNING For your safety, turn off electrical power supply before making any electrical connections to avoid possible shock hazard.

WARNING A strain relief bushing and adapter must be used at each point where wiring passes through the boiler jacket or control cases to protect wiring insulation.

Assembly illustrations and wiring diagrams

This Supplement contains two (2) wiring diagrams and associated assembly illustrations. Refer to the following, as applicable:

- Steam boilers, gravity return — Figures 4 and 5
- Steam boilers, pumped return — Figures 6 and 7

General

Refer to **EG, PEG & EGH Manual** for further information.

All wiring must be installed in accordance with the requirements of the National Electrical Code and any additional national, state or local code requirements having jurisdiction. All line voltage wiring external to boiler jacket must be N.E.C. class 1.

Provide a separate electrical circuit with a fused disconnect switch (15 amp recommended) to supply the boiler. Wiring to the boiler must be No. 14 gauge or heavier, installed in conduit.

The boiler must be electrically grounded in accordance with the National Electrical Code, ANSI/NFPA No. 70, latest edition.

Use 105 °C thermoplastic wire, or equivalent, if any original wire must be replaced (except for pilot spark and sense wires).

Wiring procedure

1. Mount all controls as directed in **Install Boiler Controls Section,** page 6, of this Supplement. Refer to the assembly illustration for the type of boiler installed (Figure 5 or 7).
2. Mount the junction box supplied with the boiler on the inside left (or right) side of the jacket as shown in the assembly illustration (using screws and nuts provided). ***Mount the junction box on the same end of the boiler as the controls will be mounted***.
3. Attach the transformer/relay to the junction box.
4. Mount the CSD-1 control panel on the jacket interior panel as shown in the appropriate assembly illustration (Figure 5 or 7), using screws and nuts provided.
5. Crimp connect ¼" spade terminals (provided) to the pilot gas valve wires if not already done in **Installation Section,** page 4 of this Supplement.
6. If optional vent damper is installed, make sure damper harness has been routed through a strain relief bushing in the jacket and damper actuator as directed in **Installation Section,** page 4 of this Supplement. Secure damper harness conduit to top of jacket with clamps provided.
7. The main gas valve wires are pre-attached to the CSD-1 control panel. The spark and sense wires from the pilot are factory installed to the pilot. Connect these wires as shown in the wiring diagram.
8. Use the wiring harness provided with the boiler to complete wiring of the remaining components according to the appropriate wiring diagram and assembly illustration.

Wiring — sequence of operation

General

The following sequence of operation applies to all wiring diagrams in this Supplement.

Call for heat

On a call for heat (from thermostat or operating control):

1. Limit control and water level control contacts are assumed closed.
2. Vent damper (if provided) will open.
3. Ignition control checks for signal at pilot. (No signal should be present.)

   If no signal is sensed (normal condition):

   a. Pilot solenoid opens.
   b. Pilot ignition spark begins.
   c. Pilot ignites.
   d. Pilot proves.

   If a signal is sensed (abnormal condition) by the ignition control, the control will lock-out.

NOTICE

On failure to establish pilot flame signal within 15 seconds, the ignition control will turn off the pilot gas valve. It will wait 5 minutes, then retry for ignition. If the second ignition attempt fails, the ignition control will lockout and illuminate the red lockout light.

This will activate the alarm contact of the impulse relay, providing an isolated contact closure across terminals A1 and A2 of the CSD-1 control panel terminal strip. The contact rating is 15 amps at 250VAC.

To reset the boiler, push the red reset button on the CSD-1 control panel.

4. Once pilot is proved the ignition control activates main gas valve. Main burners will ignite and boiler will continue to fire until terminated by limit action or no call for heat.

Lockout modes

In addition to lockout on flame-sense failure, the boiler may also experience lockout due to shutdown of a manual reset control.

NOTICE

The boiler is equipped with a manual reset limit control and a manual reset low water cutoff. Should the limit control lockout, it can only be reset by pressing the reset button on the control. The manual reset probe low water cutoff can be reset after lockout by pressing the reset button on the control or by interrupting power momentarily.

⚠ CAUTION

Steam boilers — Do not substitute another manual reset low water cutoff for the one specified and supplied with the boiler. Other controls may not operate as intended and could cause serious operating problems or failures.

Troubleshooting

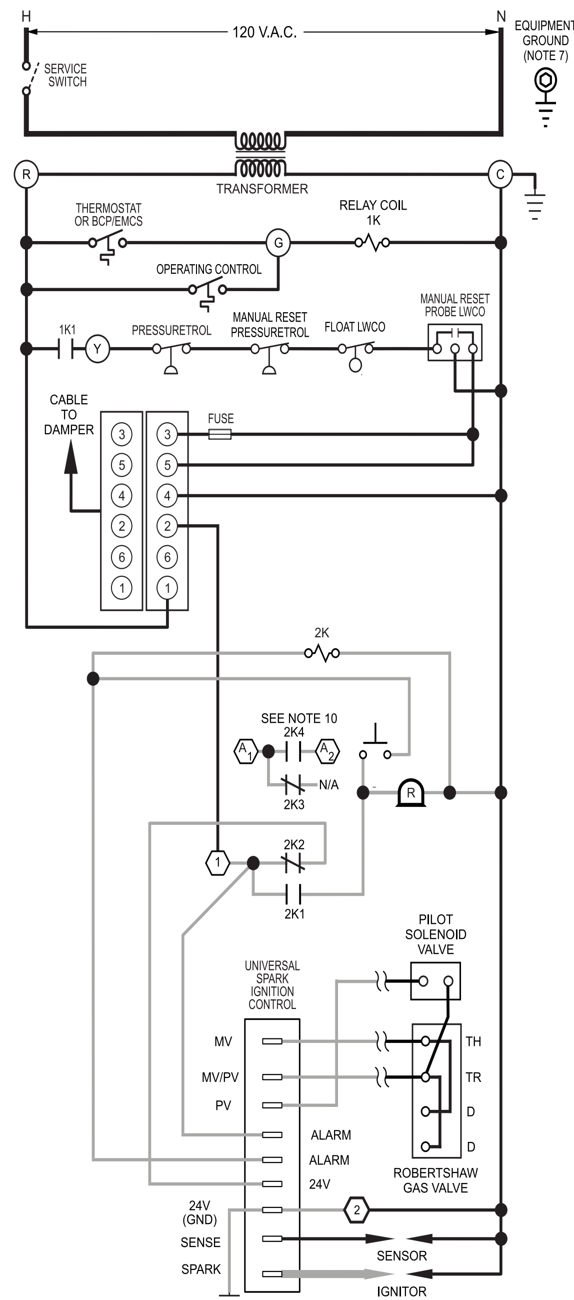
Refer to ***Check-out procedure — troubleshooting***, page 22, of this Supplement and to component manufacturer's literature supplied in the boiler manual envelope for further information on operating conditions.

Wiring — steam gravity return

Figure 4

Steam boiler wiring —
ladder and schematic diagrams

LADDER WIRING DIAGRAM



⚠WARNING ELECTRICAL SHOCK HAZARD, CAN CAUSE SEVERE INJURY OR DEATH. DISCONNECT POWER BEFORE INSTALLING AND/OR SERVICING.

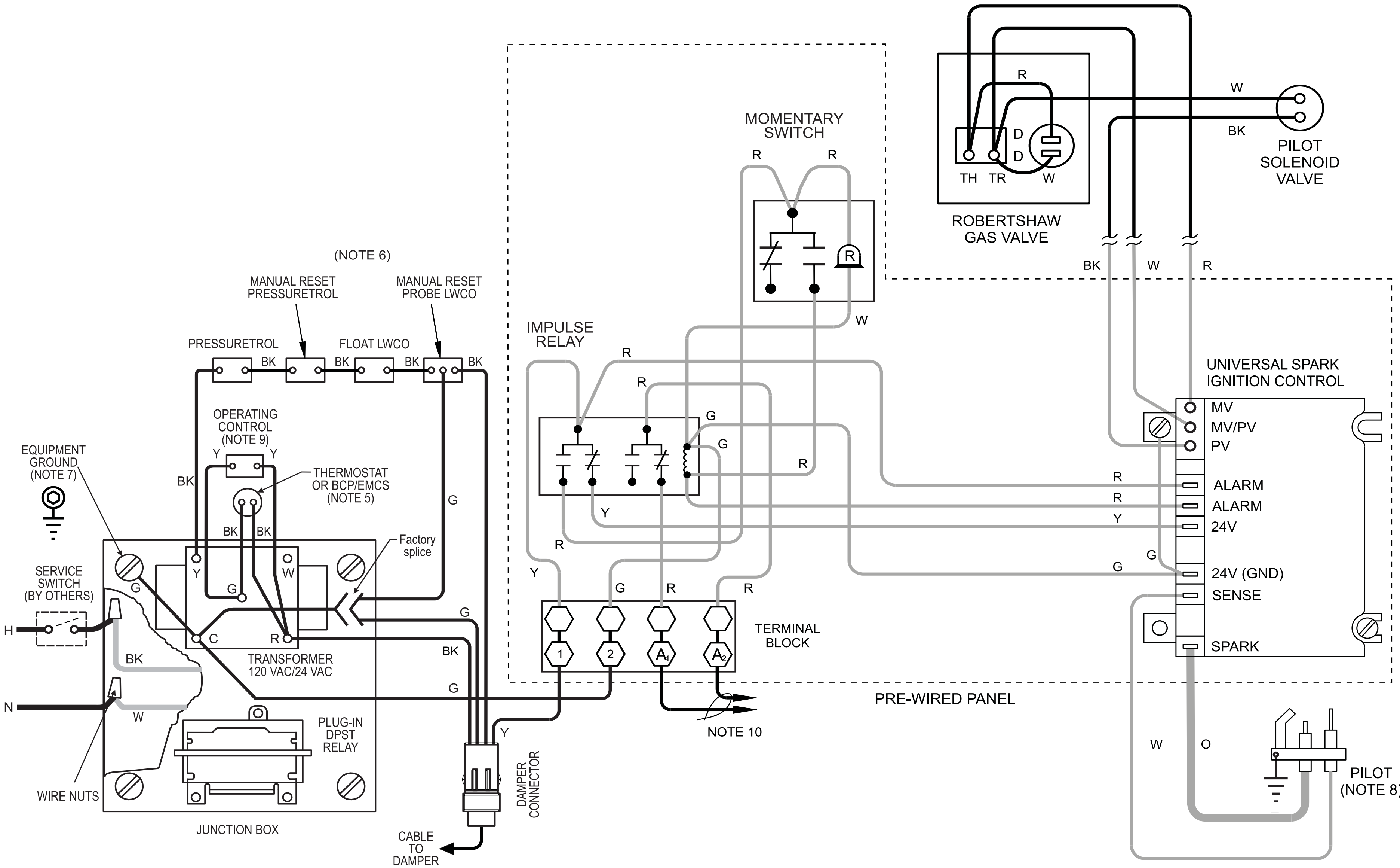
NOTES:
1. ALL WIRING MUST BE INSTALLED IN ACCORDANCE WITH:
   A. U.S.A. - NATIONAL ELECTRICAL CODE AND ANY OTHER NATIONAL, STATE OR LOCAL CODE REQUIREMENTS.
   B. CANADA - C.S.A. C22.1 CANADIAN ELECTRICAL CODE PART 1 AND ANY OTHER NATIONAL, PROVINCIAL OR LOCAL CODE REQUIREMENTS.
2. ALL CONTACTS SHOWN WITHOUT POWER APPLIED-OFF SHELF CONDITION.
3. IF ORIGINAL WIRE AS SUPPLIED WITH THE APPLIANCE MUST BE REPLACED, TYPE 105° C OR ITS EQUIVALENT MUST BE USED.
4. REFER TO CONTROL COMPONENT INSTRUCTIONS PACKED WITH BOILER FOR APPLICATION INFORMATION.
5. THERMOSTAT - FOR SINGLE ZONE SYSTEMS, THERMOSTAT ANTICIPATOR SETTING IS 0.40 AMPS. FOR MULTIPLE ZONE SYSTEMS USING ZONE VALVES OR CIRCULATORS, REFER TO COMPONENT MANUFACTURER'S INSTRUCTIONS FOR APPLICATION WIRING AND THERMOSTAT ANTICIPATOR SETTING.
   BCP/EMCS - FOR BCP/EMCS CONNECTION IN PLACE OF THERMOSTAT, REFER TO BCP/EMCS INSTALLATION/OPERATING MANUAL.
6. L.W.C.O., PRESSURE CONTROLS, WIRED IN SERIES.
7. ⏚ DENOTES FIELD INSTALLED CHASSIS GROUND.
8. PILOT LEADWIRES ARE NOT FIELD REPLACEABLE. REPLACE PILOT ASSEMBLY IF NECESSARY.
9. OPERATING CONTROL REQUIRED WITH TANKLESS HEATER.
10. ALARM CONTACT RATINGS: 15 AMP @ 250 VAC.

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LOW VOLTAGE FIELD
HIGH VOLTAGE FIELD
THERMOCOUPLE LEAD
LOW VOLTAGE FACTORY
HIGH VOLTAGE FACTORY
IGNITION CABLE

▭ CONTROL MODULE TERMINAL.
⬡ IGNITION CONTROL PANEL TERMINAL.
◯ TRANSFORMER TERMINAL.
Ⓡ IGNITION CONTROL PANEL LAMP.

SCHEMATIC WIRING DIAGRAM



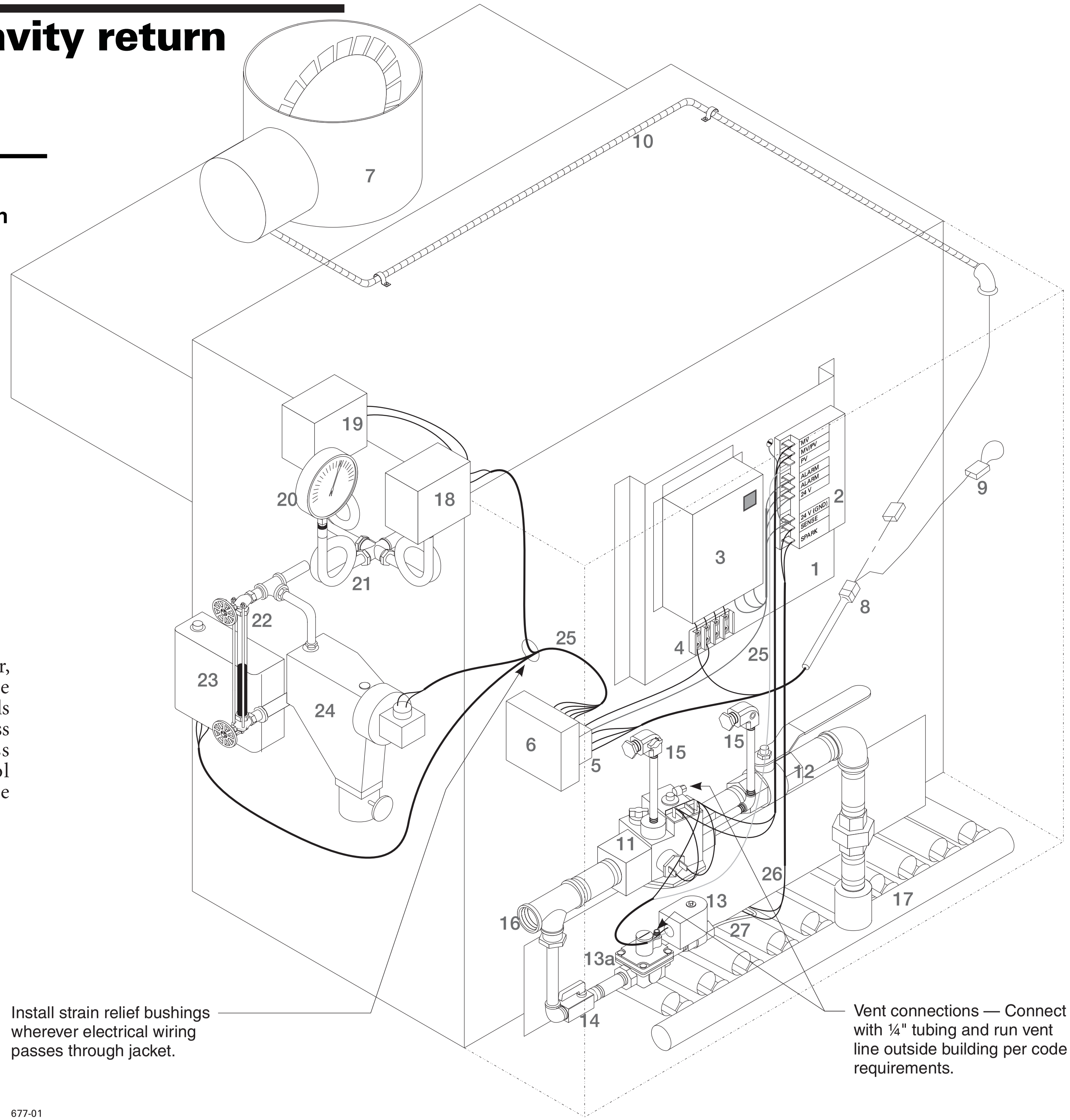
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CSD-1 control system — Natural gas

Wiring — steam gravity return

Figure 5

Control assembly — steam, gravity return



NOTICE

When using a tankless heater, knockout the opening in the inner panel. Locate the controls to allow room for the tankless heater piping. The tankless heater temperature control (not shown) installs in the heater tapping.

CSD-1 control system — Natural gas

1	CSD-1 control panel	14	Pilot shutoff valve
2	Ignition control	15	Leak test valves with plugs
3	Impulse relay and lighted push-button alarm silencing switch	16	Gas supply connection
4	Terminal Strip	17	Burner manifold
5	Transformer/relay	18	Limit control, automatic reset
6	Junction box	19	Limit control, manual reset
7	Damper (optional)	20	Pressure gauge
8	Damper connector	21	Siphons
9	Dummy plug	22	Gauge glass & valves
10	Damper harness	23	Probe LWCO, manual reset
11	Main gas valve	24	Float LWCO, automatic reset
12	Manual gas valve	25	Wire harness
13	Pilot gas valve	26	Pilot spark & sense wires
13a	Pilot gas pressure regulator	27	Pilot gas tubing

Wiring — steam pumped return

Figure 6

Steam boiler wiring —
ladder and schematic diagrams

⚠WARNING ELECTRICAL SHOCK HAZARD, CAN CAUSE SEVERE INJURY OR DEATH. DISCONNECT POWER BEFORE INSTALLING AND/OR SERVICING.

NOTES:

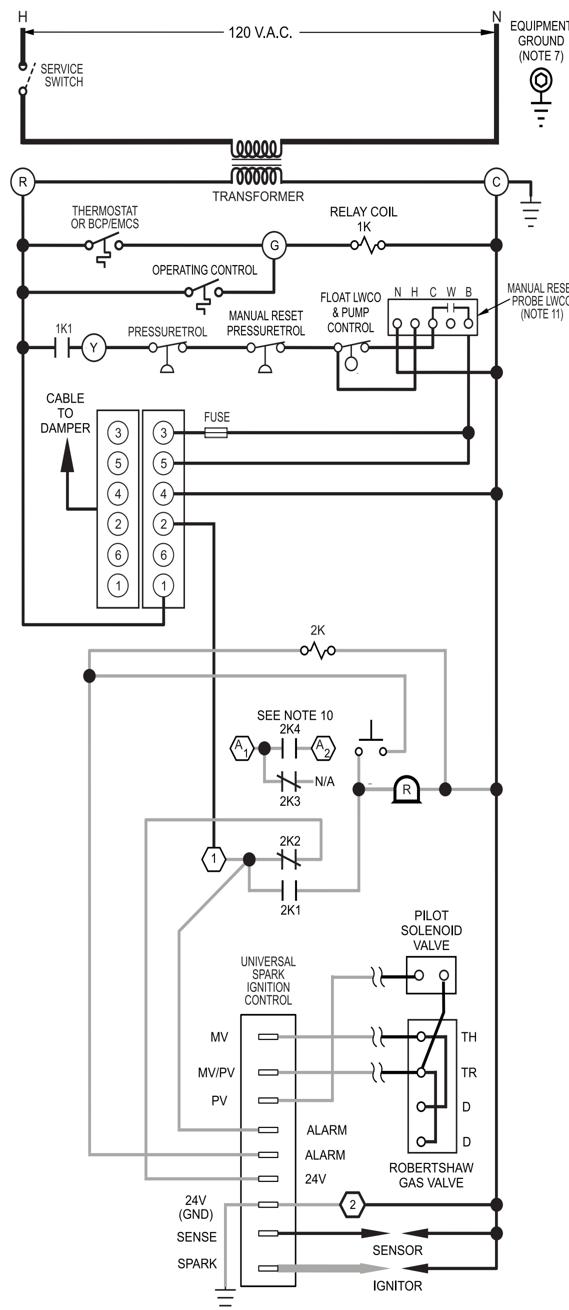
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2. ALL CONTACTS SHOWN WITHOUT POWER APPLIED-OFF SHELF CONDITION.
3. IF ORIGINAL WIRE AS SUPPLIED WITH THE APPLIANCE MUST BE REPLACED, TYPE 105° C OR ITS EQUIVALENT MUST BE USED.
4. REFER TO CONTROL COMPONENT INSTRUCTIONS PACKED WITH BOILER FOR APPLICATION INFORMATION.
5. THERMOSTAT - FOR SINGLE ZONE SYSTEMS, THERMOSTAT ANTICIPATOR SETTING IS 0.40 AMPS. FOR MULTIPLE ZONE SYSTEMS USING ZONE VALVES OR CIRCULATORS, REFER TO COMPONENT MANUFACTURER'S INSTRUCTIONS FOR APPLICATION WIRING AND THERMOSTAT ANTICIPATOR SETTING.
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7. ⏚ DENOTES FIELD INSTALLED CHASSIS GROUND.
8. PILOT LEADWIRES ARE NOT FIELD REPLACEABLE. REPLACE PILOT ASSEMBLY IF NECESSARY.
9. OPERATING CONTROL REQUIRED WITH TANKLESS HEATER.
10. ALARM CONTACT RATINGS: 15 AMP @ 250 VAC.
11. **REMOVE JUMPER BAR BETWEEN TERMINAL "H" AND TERMINAL "C".**

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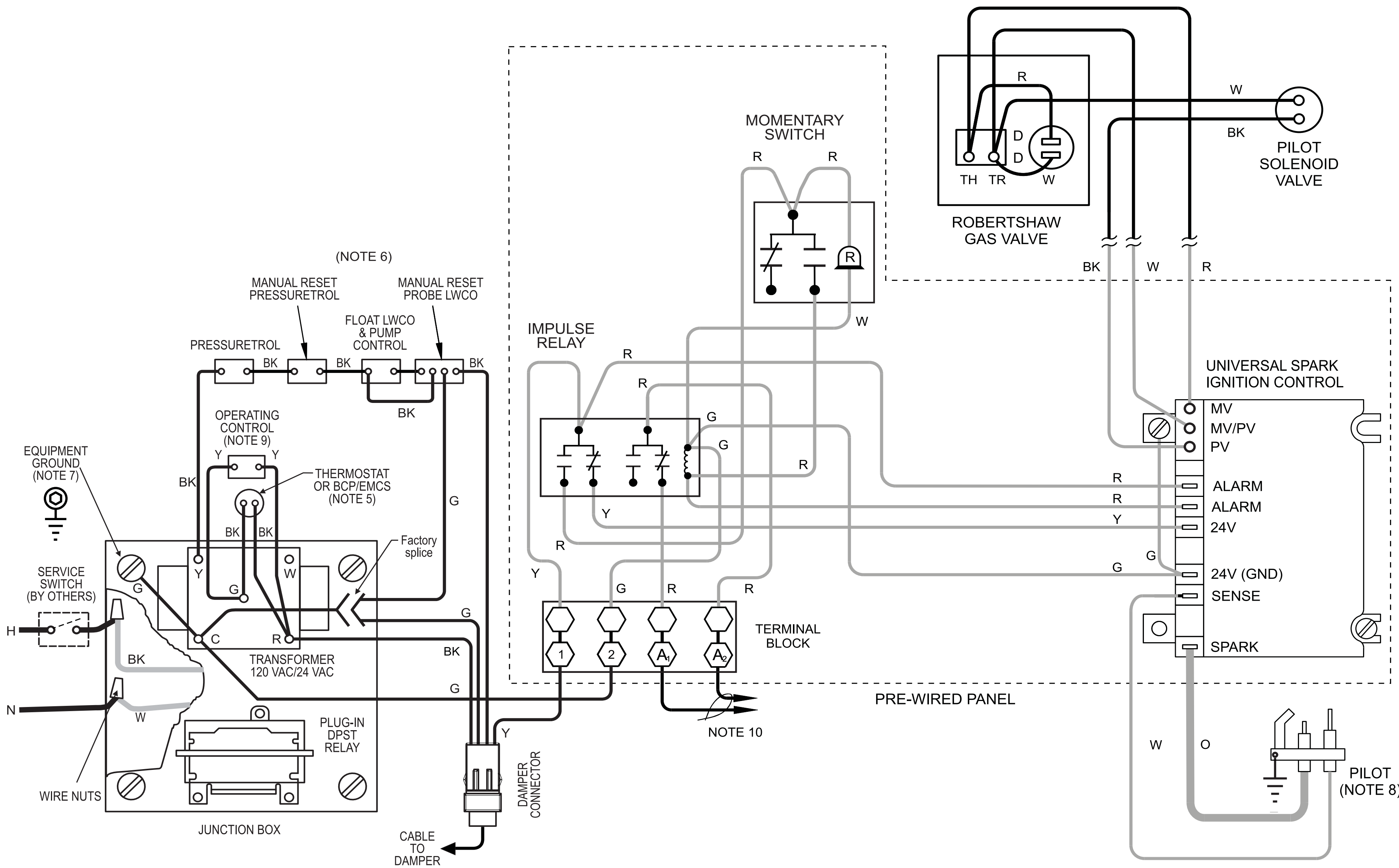
LOW VOLTAGE FIELD
HIGH VOLTAGE FIELD
THERMOCOUPLE LEAD
LOW VOLTAGE FACTORY
HIGH VOLTAGE FACTORY
IGNITION CABLE

▭ CONTROL MODULE TERMINAL.
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◯ TRANSFORMER TERMINAL.
Ⓡ IGNITION CONTROL PANEL LAMP.

LADDER WIRING DIAGRAM



SCHEMATIC WIRING DIAGRAM



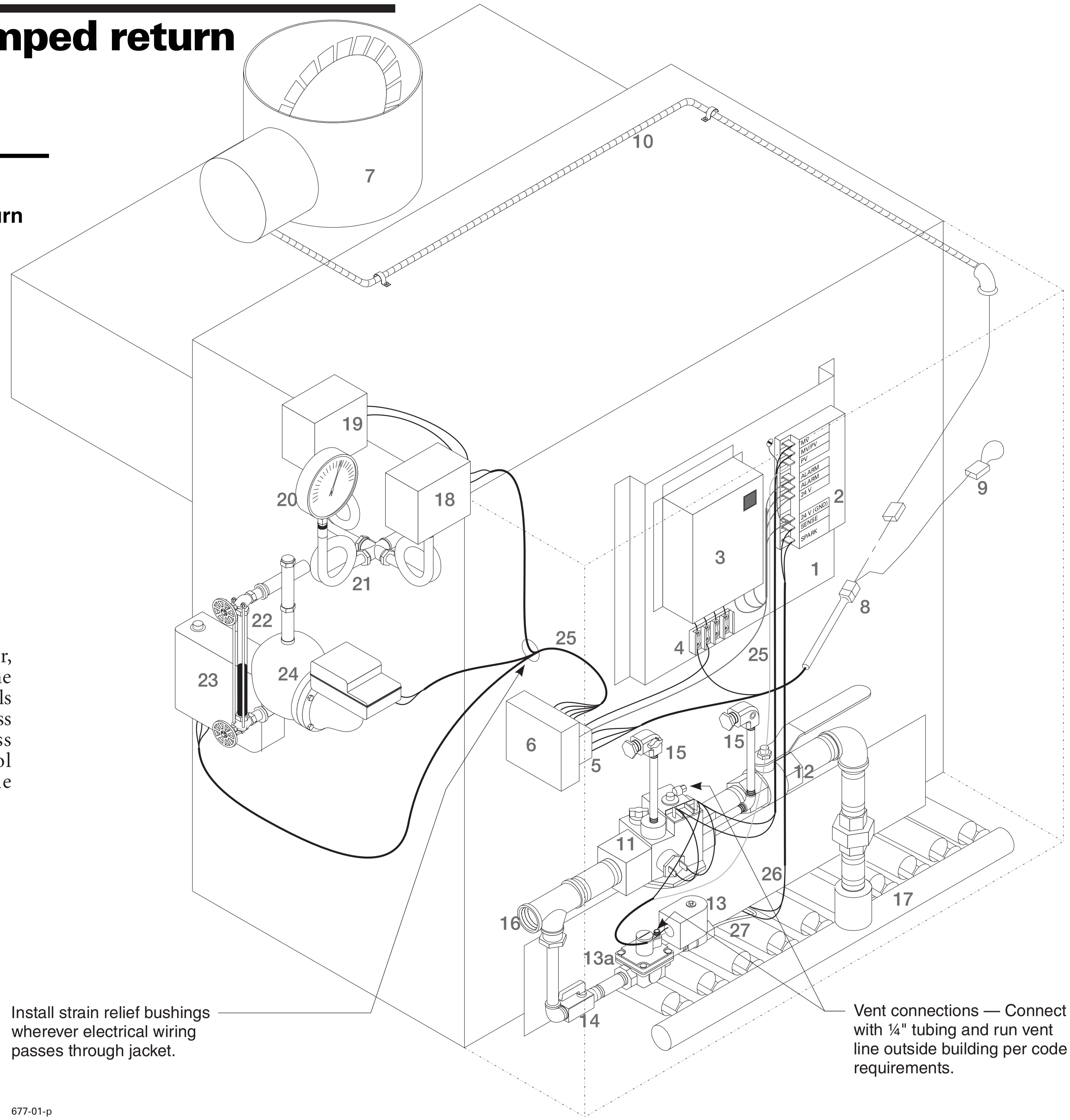
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CSD-1 control system — Natural gas

Wiring — steam pumped return

Figure 7

Control assembly — steam, pumped return



NOTICE When using a tankless heater, knockout the opening in the inner panel. Locate the controls to allow room for the tankless heater piping. The tankless heater temperature control (not shown) installs in the heater tapping.

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10	Damper harness	23	Probe LWCO, manual reset
11	Main gas valve	24	Float LWCO, pump control, auto reset
12	Manual gas valve	25	Wire harness
13	Pilot gas valve	26	Pilot spark & sense wires
13a	Pilot gas pressure regulator	27	Pilot gas tubing

Final adjustments

Before proceeding:

1. Follow **EG, PEG & EGH Manual** instructions for ***Final Adjustments***, including filling the boiler and skimming steam boilers.

⚠WARNING Skimming the boiler as described the **EG, PEG & EGH Manual** requires firing the boiler.
Always follow boiler ***Operating instructions***, Figure 8, when starting the boiler. Failure to do so could result in severe personal injury, death or substantial property damage.

2. Inspect base insulation as instructed in the **EG, PEG & EGH Manual**.

To place boiler in operation:

1. Follow ***Operating instructions***, Figure 8, to start boiler.
2. **If boiler starts** correctly, proceed with ***Check-out procedure***, page 20 of this Supplement.
3. **If boiler fails to start**, check:
   - ❏ Loose connection or blown fuse?
   - ❏ Limit setting below boiler water temperature or steam pressure?
   - ❏ Thermostat below room temperature?
   - ❏ Manual reset device needs to be reset?
   - ❏ Gas not turned on at meter and boiler?
   - ❏ Incoming natural gas pressure less than 5" W. C.?
4. If above fails to eliminate the trouble, refer to ***Check-out procedure — troubleshooting*** in this Supplement, page 22.

Final adjustments — operating instructions

Figure 8 Operating instructions

FOR YOUR SAFETY READ BEFORE OPERATING

⚠WARNING If you do not follow these instructions exactly, a fire or explosion may result causing property damage, personal injury or loss of life.

A. This appliance is equipped with an ignition device which automatically lights the pilot. Do not try to light the pilot by hand.

B. BEFORE OPERATING, smell all around the appliance area for gas. Be sure to smell next to the floor because some gas is heavier than air and will settle on the floor. See below.

C. Use only your hand to depress or turn the gas control knob. Never use tools. If the knob will not depress or turn by hand, don't try to repair it, call a qualified service technician. Force or attempted repair may result in a fire or explosion.

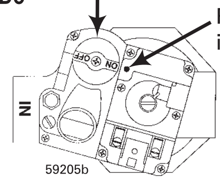
D. Do not use this appliance if any part has been under water. Immediately call a qualified service technician to inspect the appliance and to replace any part of the control system and any gas control, which has been under water.

WHAT TO DO IF YOU SMELL GAS

- Do not try to light any appliance.
- Do not touch any electric switch; do not use any phone in your building.
- Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
- If you cannot reach your gas supplier, call the fire department.

OPERATING INSTRUCTIONS

1. STOP! Read the safety information above on this label.
2. Set the thermostat to lowest setting.
3. Turn off all electrical power to the appliance.
4. Remove front panel.
5. This appliance is equipped with an ignition device which automatically lights the pilot. Do not try to light the pilot by hand.
6. Turn gas control knob clockwise ↷ to "OFF."
7. When equipped with vent damper, verify damper blade is in full open position.
8. Wait five (5) minutes to clear out any gas. Then smell for gas, including near the floor. If you smell gas, STOP! Follow "B" in the safety information above. If you don't smell gas, go to the next step.
9. Turn gas control knob counterclockwise ↶ to "ON."
10. Turn on all electric power to the appliance.
11. Set thermostat to desired setting.
12. If the appliance will not operate, follow the instructions "To Turn Off Gas To The Appliance" and call your service technician or gas supplier.
13. Replace front panel.



TO TURN OFF GAS TO THE APPLIANCE

1. Set the thermostat to lowest setting.
2. Turn off all electric power to the appliance if service is to be performed.
3. Remove front panel.
4. Turn gas control knob clockwise ↷ to "OFF." Do not force.
5. Replace front panel.

550-223-045(1209)

Check-out procedure — operation

⚠WARNING Always follow boiler ***Operating instructions***, Figure 8, page 19 when starting the boiler. Failure to do so could result in severe personal injury, death or substantial property damage.

1. Increase setting of room thermostat (or operating control) to call for heat.

2. Vent damper (if provided) will slowly open. When damper is fully open, the ignition control will open pilot gas valve and start spark.

⚠DANGER Vent damper must be in open position when appliance main burners are operating. If damper is not in open position, flue products will spill into the building, causing severe personal injury or death.

3. If pilot lights and proves within 15 seconds, the ignition control turns off the spark and opens the main gas valve (dual valves in single body). Main burners ignite.

NOTICE If pilot does not light and prove within 15 seconds, the ignition control shuts off pilot gas and spark and waits 5 minutes. It then will retry. If the second ignition attempt fails, the ignition control will lockout and close the alarm contact of the impulse relay.

4. During main burner operation:
   - The ignition control monitors pilot flame current. If signal is lost, main valve is closed, spark is activated, and the operating sequence returns to step 3.
   - If power is interrupted, the control system shuts off pilot and main gas valves and restarts at Step 1 when power is restored.

5. Stop the call for heat (lower thermostat or operating control).
   - Pilot and main gas valves will close.
   - Damper (if provided) will close.

6. Boiler is now in the off cycle.

7. Repeat steps 1 through 6 several times to verify operation.

8. Return thermostat or operating control to normal setting.

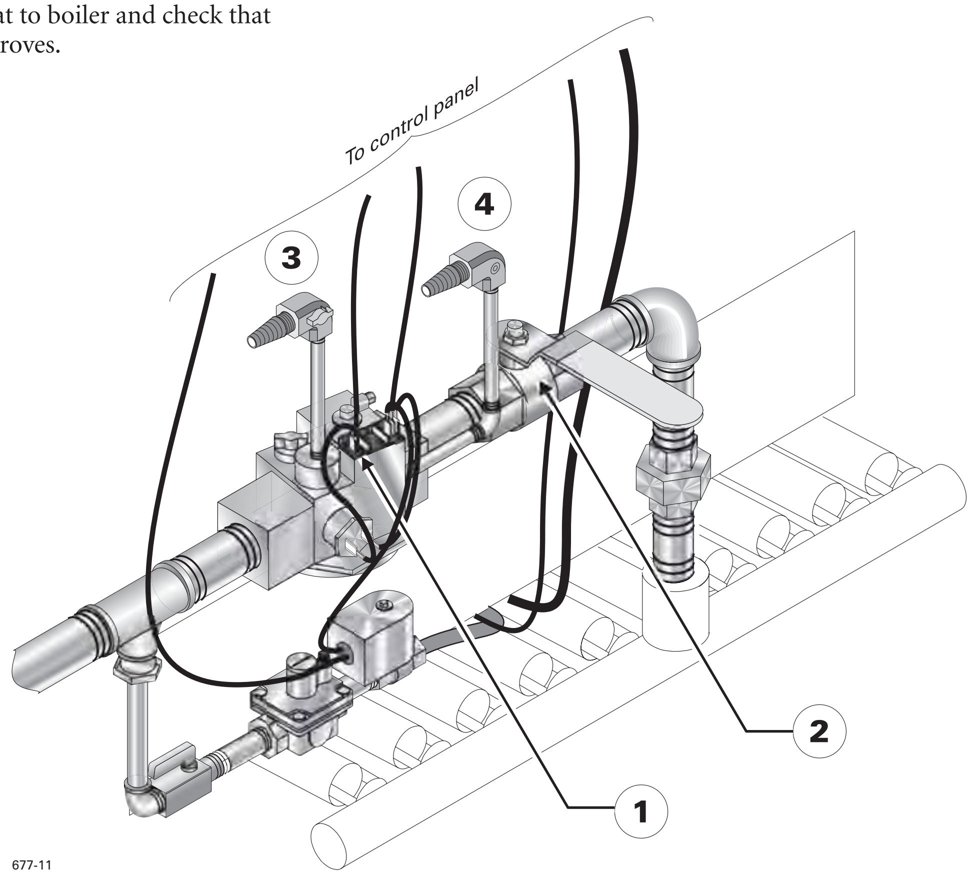
Check-out procedure — leak test

WARNING For your safety, turn off electrical power supply before making any electrical connections to avoid possible shock hazard.

1. Turn off power to the boiler and remove the (RED) wire from terminal TH of the main gas valve (Figure 9, item 1). Tape off terminal end of removed wire and restore power to the boiler.
2. Close manual gas valve (Figure 9, item 2).
3. Check that both leak test valves (Figure 9, items 3 and 4) are closed. Then remove plugs and insert 1/8" NPT hose barb fittings as shown in Figure 9.
4. Attach a U-tube manometer to first leak test valve (Figure 9, item 3).
5. Open first leak test valve (Figure 9, item 3) and check for pressure. See NOTICE at right.
6. Close first leak test valve (Figure 9, item 3) and remove manometer.
7. Attach manometer to second leak test valve (Figure 9, item 4).
8. Apply call for heat to boiler and check that electronic pilot proves.
9. Open second leak test valve (Figure 9, item 4) and check for pressure. See NOTICE below.
10. Close second leak test valve and remove manometer.
11. Remove call for heat to boiler. Turn off power to the boiler.
12. Remove hose barbs from leak test valves and replace plugs.
13. Replace (RED) wire to terminal TH of gas valve.
14. Open manual gas valve (Figure 9, item 2) and restore power to boiler.

NOTICE When checking for pressure at the leak test valves, it is normal to find a small pressure reading. If the pressure continues to rise after opening the leak test valve, the main valve seat is leaking and should be replaced.

Figure 9
Leak test procedure



Check-out procedure — troubleshooting

Verify proper operation after servicing

WARNING Never jumper (bypass) any device except for momentary testing as outlined in Troubleshooting Charts. Substantial property damage and/or severe personal injury could occur.

DANGER Burner access panel must be in position during boiler operation to prevent momentary flame rollout on ignition of main flame. Severe personal injury or substantial property damage will result.

WARNING Label all wires prior to disconnection when servicing controls. Wiring errors can cause improper and dangerous operation.

Before troubleshooting:

a. Have a voltmeter that can check 120VAC, 24VAC, a microammeter with minimum scale range of 0–25, and continuity tester.
b. Check for 120VAC (minimum 102 – maximum 132) to boiler.
c. Check for 24VAC at secondary side of transformer.
d. Make sure thermostat is calling for heat and contacts (including appropriate zone controls) are closed. Check for 24VAC between thermostat wire nuts and ground.

In event of actuator failure:

Effikal or Field Controls damper:

If troubleshooting chart recommends replacing actuator and actuator is not immediately available, damper blade can be fixed in an open position to allow boiler operation. Manually turning blade can cause actuator damage. Follow these instructions only in case of no heat or damper actuator malfunction. See Figure 10.

1. Move damper service switch to "**HOLD DAMPER OPEN**" position. Apply call for heat to boiler. Damper blade should then rotate to open position and boiler will fire.
2. If Step 1 does not open damper, manually rotate damper blade to open position using wrench or pliers on flat shaft between damper and actuator (Figure 10). Boiler will fire.
   Verify that damper service switch is in "**HOLD DAMPER OPEN**" position.
3. Do not leave damper permanently in this position. Replace actuator immediately. If damper is left in open position, boiler will not operate at published efficiencies.

See damper manufacturer's instructions packed with damper for additional information.

Johnson damper:

If troubleshooting chart recommends replacing actuator and actuator is not immediately available, damper blade can be fixed in an open position to allow boiler operation. Follow these instructions only in case of no heat or damper actuator malfunction. See Figure 10.

1. Turn off power to boiler.

WARNING Failure to turn off power to boiler can result in severe personal injury, death or substantial property damage.

2. Refer to damper manufacturer's instructions for procedure to fix damper in open position.
3. Turn on power to boiler.
4. Using wrench or pliers on flat shaft section, manually rotate damper blade until green light turns on. Boiler will fire.
5. Do not leave damper permanently in this position. Replace actuator immediately. If damper is left in open position, boiler will not operate at published efficiencies.

See damper manufacturer's instructions packed with damper for additional information.

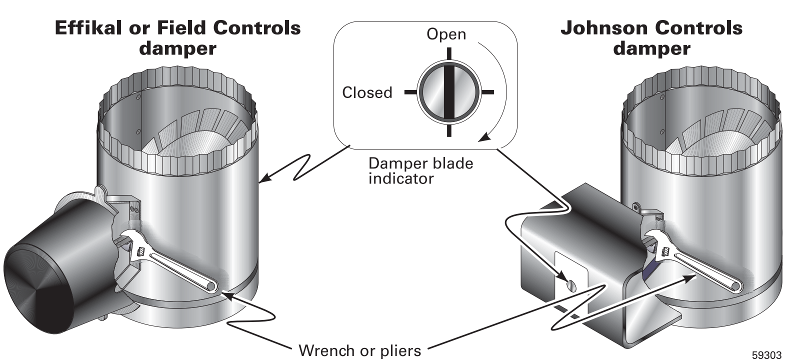


Figure 10

Temporary manual opening of vent damper — refer also to vent damper manufacturer's instructions.

Check-out procedure — troubleshooting

TS-1: No Spark — System (boiler without vent damper) does not work

VISUALLY CHECK — Is ground wire connected from **GND (Burner)** to ignition control mounting screw, and ground wire connected from transformer terminal **C** to case ground?

No → Correct by making connections.

Yes ↓

Is 24VAC present across terminals 24V and 24V(GND)?

No → Check for open thermostat, circulator relay, operating control, limit control or LWCO. Check the CSD-1 control panel, impulse relay and push-button switch.

⚠WARNING If limit controls or water level controls lockout on manual reset, determine cause and correct condition. Failure to do so could result in severe personal injury, death or substantial property damage.

Yes ↓

Open thermostat (or operating control) contacts for 15 seconds. Close thermostat contacts. Is 24VAC across terminals **PV** & **MV/PV**?

No → Replace ignition control. Retest.

Yes ↓

Turn OFF supply voltage.

⚠WARNING Electrical shock hazard. Failure to turn off power before proceeding could cause severe personal injury or death.

↓

Check spark wire. Is it securely connected to spark transformer?

No → Securely connect spark wire. Then turn ON supply voltage. Retest.

Yes ↓

Is condition of spark wire good (not cut, brittle, burned or cracked)?

No → Replace pilot assembly. Retest.

Yes ↓

Is spark electrode ceramic cracked?

No → Is spark gap 0.125" and isolated in pilot gas stream?

- No → Replace pilot assembly, turn ON supply voltage. Operate system several complete heat cycles.
- Yes → Replace ignition control. Retest.

Yes → Replace pilot assembly, turn ON supply voltage, operate system several complete heat cycles.

Check-out procedure — troubleshooting

TS-2: No Spark — System (boiler with vent damper) does not work

Is damper harness securely plugged in at both ends?

No → Secure connections. | Yes ↓

Is 24VAC present across transformer terminals **C** & **Y**?

No → Check for loose wire connections or bad relay on transformer. | Yes ↓

Is 24VAC present across terminal **C** and yellow wire on damper connector?

No → Check for open thermostat, circulator relay, operating control, limit control or LWCO. Check the CSD-1 control panel, impulse relay and push-button switch.

⚠WARNING If limit controls or water level controls lockout on manual reset, determine cause and correct condition. Failure to do so could result in severe personal injury, death or substantial property damage.

Yes ↓

Is damper rotated open?

No → Check for out of round stack section. Does motor rotate open?
- No → Replace actuator. Retest.
- Yes → Is 24VAC present across terminals **PV** and **MV/PV**?

Yes ↓

Is 24VAC present across terminals **PV** and **MV/PV**?

No → Open thermostat contacts for 30 seconds. Damper will rotate to closed position. Close thermostat contacts. Damper will rotate to open position. Is 24VAC present across terminals **PV** and **MV/PV**?
- Yes → Is spark present now?
- No → Check continuity of each wire in wiring harness to damper. Does continuity exist for each wire?
  - No → Replace damper wiring harness. Retest.
  - Yes → Remove damper harness from boiler wiring harness. TEMPORARILY install jumper between terminal **2** and terminal **5** on damper plug in boiler wiring harness. See figure below. Does boiler fire?
    - No → Replace ignition control. Retest.
    - Yes → Replace damper actuator. Retest.

Yes ↓

Is spark present now?

Yes → Retest.

No → Turn OFF supply voltage.

⚠WARNING Electrical shock hazard. Failure to turn off power before proceeding could cause severe personal injury or death.

Check spark wire. Is it securely connected to ignition control?

No → Securely connect and turn ON supply voltage. Retest. | Yes ↓

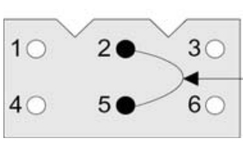
Is condition of spark wire good (not brittle, burned or cracked)?

No → Replace pilot assembly. Retest. | Yes ↓

Is spark electrode ceramic cracked?

Yes → Replace pilot assembly. → Turn ON supply voltage and operate system several complete cycles.

No → Is spark gap 0.125" and located in pilot gas stream?
- No → Replace pilot assembly. → Turn ON supply voltage and operate system several complete cycles.
- Yes → Replace ignition control. Retest.



Temporary jumper

Check-out procedure — troubleshooting

TS-3: Pilot lights — Main valve will not come on (boiler with or without damper)

Does spark stay on for more than a few seconds after pilot is established?

- **No** →
  - **Is 24VAC between terminals MV and MV/PV on ignition control?**
    - No → Replace ignition control. Retest.
    - Yes →
      - **Is inlet gas pressure at least 5.0" W.C. and not over 14" W.C.?**
        - No → Contact gas supplier to correct.
        - Yes →
          - **Is main valve wiring secure at terminals?**
            - No → Correct wiring. Retest.
            - Yes → Replace valve. Retest.
- **Yes** →
  - Turn OFF supply voltage.

    ⚠WARNING Electrical shock hazard. Failure to turn off power before proceeding could cause severe personal injury or death.
  - Make sure sense wire is not wrapped around any pipe or accessories.
  - **Is sense wire securely attached to sense terminal and pilot assembly?**
    - No → Correct and retest.
    - Yes →
      - **Is sensing probe ceramic cracked?**
        - Yes → Replace pilot assembly. Retest.
        - No →
          - **Is sense wire or sensing probe shorted out to metal surface?**
            - Yes → Correct and retest.
            - No →
              - **Check for continuity of sense wire and condition of insulation.**
                - NOT OK → Replace pilot assembly. Retest.
                - OK →
                  - **Does system have proper flame signal?**

                    Set up microammeter to measure output current in flame sensor circuit as follows.

                    a. Detach sense lead from ignition control. Attach negative lead from microammeter to sense terminal on ignition control.

                    b. Attach positive lead to sense wire from pilot assembly.

                    c. Disconnect main valve lead from terminal **MV** on ignition control.

                    d. Energize the system. Spark should ignite the pilot. As soon as pilot is burning, microammeter should read at least 0.5 microamp for U.T. # 1003-615.

                    e. Is flame current signal less than the minimum specified in **d** above?
                    - No → Replace ignition control. Retest.
                    - Yes → Check for proper gas pressure, clean pilot assembly, tight mechanical and electrical connections. Also check for proper system grounding per following page.

Check-out procedure — troubleshooting

TS-3: Pilot lights — Main valve will not come on - *continued from previous page*

⚠WARNING	Turn OFF supply voltage. Electrical shock hazard. Failure to turn off power before proceeding could cause severe personal injury or death.

To check ignition system grounding (instruction for continuation of TS-3)	
Pilot assembly and ignition control must share common ground with main burner. Nuisance shutdowns are often caused by poor or erratic ground. Check for good metal-to-metal contact between pilot burner bracket and main burner and between main burner and burner rest.	Check ground lead from **GND (Burner)** terminal on ignition control to ignition control mounting screw and from **C** on transformer to transformer case ground. Make sure connections are clean and tight. If wire is damaged or deteriorated, replace with No. 18 gauge moisture-resistant, thermoplastic insulated wire with 105 °C minimum rating.

TS-4: Spark is present - pilot will not light (boiler with or without damper)

Are pilot valve wiring connections CORRECT and securely fastened?
- **No** → Connect securely to terminal **PV** on ignition control and terminal **TR** on main gas valve.
- **Yes** → **Is inlet gas pressure at least 5.0" W.C. and not over 14" W.C.?**
  - **No** → **Is pilot shutoff valve open?**
    - **No** → Open pilot shutoff valve.
    - **Yes** → Contact gas supplier to correct gas pressure.
  - **Yes** → **Is gas present at pilot burner assembly?**

    ⚠CAUTION Remove **MV** wire from ignition control. Use a match taped to a long screwdriver or pilot lighter rod and manually light pilot.
    - **No** → Make sure pilot shutoff valve is open, 24VAC is present to pilot valve and pilot line is not kinked or obstructed. Check for clean pilot orifice. If OK, replace pilot gas valve.
    - **Yes** → **Is spark gap 0.125" and located in pilot gas stream?**
      - **No** → Replace pilot assembly.
      - **Yes** → Block any draft around boiler. Check for clean pilot orifice.

Part Number 550-110-677/1112

Service and maintenance

Complete Installation and Service Certificate in **EG, PEG & EGH Manual**, page 27.

Follow **EG, PEG & EGH Manual**, for service and maintenance of boiler.

Replacement parts — steam boilers

Figure 11 Steam boiler assembly

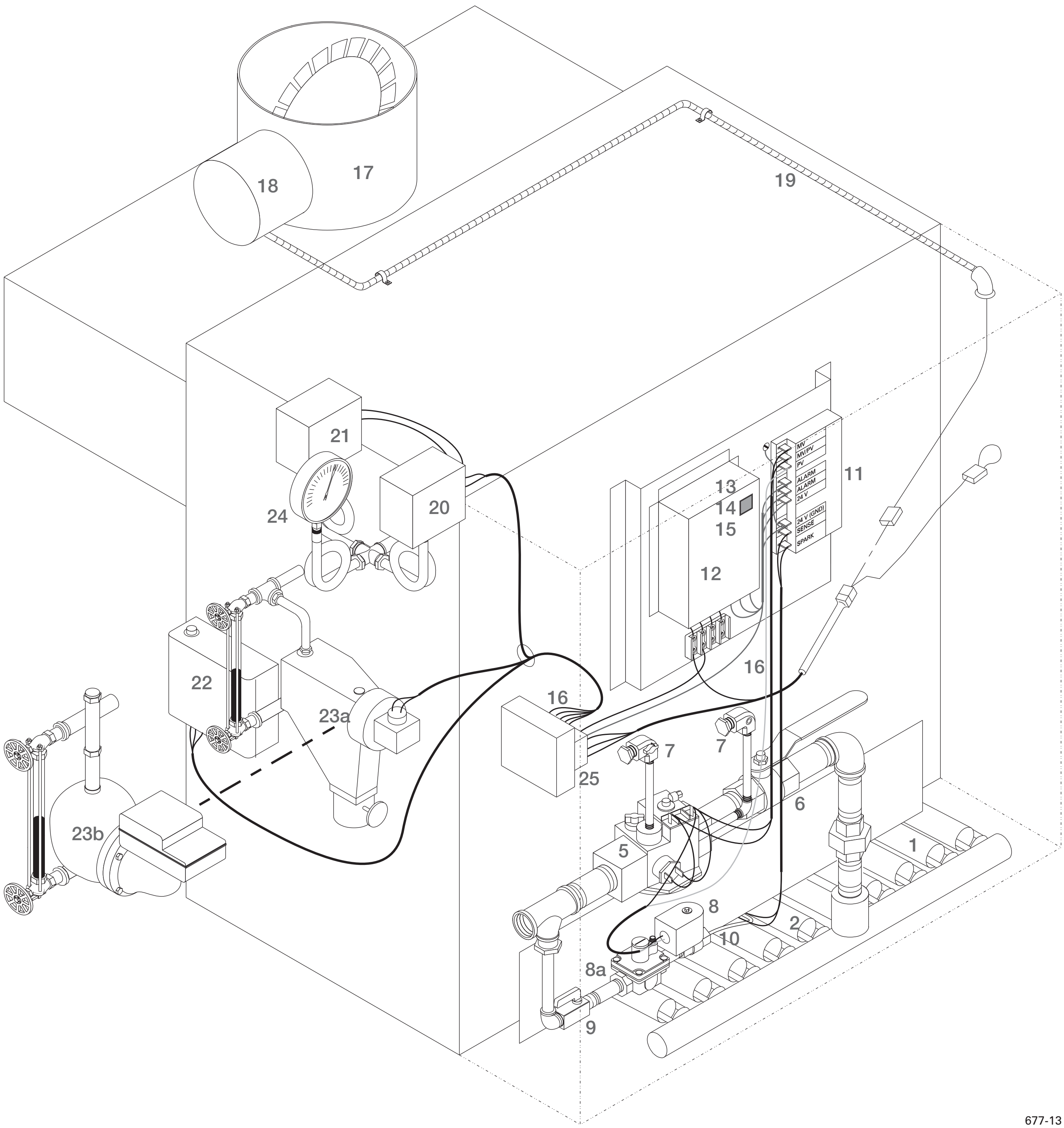


Table 3 Steam boiler replacement parts

⚠WARNING Before replacing any parts on the boiler — Turn off power to boiler and shut off gas supply. Failure to comply could result in severe personal injury, death or substantial property damage.

Item	Description	Boiler Model	Supplier	Manufacturer part number	Weil-McLain part number
1	Main burner, stainless steel	EGH-105 – 125	Weil-McLain	—	512-200-000
2	Main burner, SS with pilot bracket	EGH-105 – 125	Weil-McLain	—	512-200-001
4	Pilot burner (not shown)	EGH-105 – 125	PSE	E48A-1	511-330-221
5	Main gas valve	EGH-105 – 125	Robertshaw	7000DERHC-S7C	511-044-287
6	Manual gas valve, 1” NPT	EGH-105 – 125	Watts	FBV3-06	511-246-290
7	Leak test valve	EGH-105 – 125	Key Gas	—	511-246-339
8	Pilot gas valve	EGH-105 – 125	Honeywell	V8046C-1014	511-044-039
8a	Pilot gas pressure regulator	EGH-105 – 125	Maxitrol	RV20VL	510-933-195
9	Pilot shutoff valve	EGH-105 – 125	Conbraco	53-300-01	511-246-345
10	Pilot tubing, Alum. 1/8” O.D. x 34” long	EGH-105 – 125	Available at local supply house		
11	Ignition control	EGH-105 – 125	United Technologies	1003-615	511-330-086
12	Impulse relay	EGH-105 – 125	Potter-Brumfield	S89R-11ABD1-24	510-350-226
13	Push-button switch	EGH-105 – 125	Honeywell Eaton Controls	AML21CBA2AA 221K11810	511-624-580
14	Lens cover	EGH-105 – 125	Honeywell Eaton Controls	AML51-C10R 220PM02A	511-624-581
15	Light bulb	EGH-105 – 125	TI-3/4 Available at local supply house		
16	Wiring harness, pumped return steam Wiring harness, gravity return steam	EGH-105 – 125	Weil-McLain	—	591-391-888 591-391-887
17	Vent damper assembly — optional (not for use in Canada)	EGH-105 — 10”	Effikal Field Controls Johnson	RVGP-KS-10BKF GVD-10 Q35GP-2 (note 1)	381-800-446
		EGH-115 — 12” EGH-125 — 12”	Effikal Field Controls Johnson	RVGP-KS-12BKF Controls GVD-12 Q35GR-2 (note 1)	381-800-447
18	Vent damper actuator	EGH-105 – 125	Effikal	RVGP	510-512-337
19	Vent damper harness	EGH-105 – 125	Weil-McLain	—	591-391-795
20	Limit control, automatic reset	EGH-105 – 125	Honeywell White-Rodgers	PA-404-A P47EA-1	510-312-135 510-311-023
21	Limit control, manual reset	EGH-105 – 125	Honeywell	L4004C-1147	510-312-060
22	Probe LWCO, manual reset	EGH-105 – 125	McDonnell & Miller	PS852M-24	511-114-530
23a	Float LWCO, automatic reset	EGH-105 – 125	McDonnell & Miller	67W-1	511-114-494
23b	Float LWCO/ pump control auto reset	EGH-105 – 125	McDonnell & Miller	42-A	511-114-531
24	Pressure gauge	EGH-105 – 125	Ametek	P505K	510-218-045
25	Transformer/relay	EGH-105 – 125	Honeywell	R8285D-5001	510-312-169
Note 1 — Johnson damper assembly consists of M35BC actuator and Y15 vent pipe.					
Replacement parts must be purchased through a local Weil-McLain distributor. When ordering, specify boiler model and series and include description and number of replacement part. Results from using modified or other manufactured parts will not be covered by warranty and may damage boiler or impair operation.					
Refer to boiler manual for parts not listed above.					

Notes

Notes

Weil-McLain
500 Blaine Street
Michigan City, IN 46360-2388
http://www.weil-mclain.com

Part Number 550-110-677/1112